Regional Signal Timing Program

Project Administration

Deliverables

1. Detailed Workscope, Schedule, and Budget (DWSB)
   - Prepared by the consultant.
   - Should include project understanding; detailed task descriptions, including meetings and assumptions on data to be obtained from city; milestone deadlines; level of effort; and budget.
   - Changes to scope of work after final DWSB must be approved by MTC.
2. Existing Conditions Technical Memorandum, including computer model with existing timings
   - Will summarize the data collected to date and will be used as the baseline for improvements. Sponsor and other stakeholders to decide whether data makes sense and model is sufficiently calibrated.
   - Will also contain preliminary recommendations for optimization of actuated settings.
3. Recommendations Technical Memorandum, including computer model with recommended timings
   - Will contain approved changes to actuated settings, and recommended time-of-day coordination plans and hours of coordinated operation.
   - Discussion will include analyses of signal groupings, phasing, cycle lengths, splits, and offsets, as well as expected improvements.
   - Sponsor and other stakeholders to decide if recommendations are consistent with their objectives for the project.
4. A. Draft Timing Sheets
   - Will contain timings to be used for implementation. Sponsor and other stakeholders to review for consistency with approved timings.

   B. Final Timings and Evaluation Technical Memorandum, including final timing sheets and computer model with final timings
   - Will contain final timings that were implemented and fine-tuned, as well as measured improvements.

Deliverable Review

- All deliverables subject to review and approval by sponsor, other stakeholders, and MTC.
- MTC's review to focus on adherence to approved scope of work.
- Consultant will indicate when comments are due and follow-up with sponsor as deadline nears.
- Requests for extension of review period should go through MTC. No communication with either MTC or the consultant by the time a deadline has passed may be grounds for terminating the project.
- Please cc MTC on all written correspondence, including e-mail.
- MTC will provide copies of our comments to the sponsor.

Schedule

Projects must be completed by November 30, 2004, unless otherwise indicated in DWSB and approved by MTC.

Grant Administration

- Consultant will submit invoices to MTC directly.
- Payment will correspond to approval of deliverables: 5% for DWSB, 40% for Existing Conditions Memo, and 30% for Recommendations Memo, 10% for Draft Timing Sheets, 15% for Final Timings and Evaluation Memo. Roughly corresponds to level of effort.

Conflict Resolution

Notify MTC as soon as possible.

Standardized Scope of Work for All RSTP Consultants

The services to be performed by CONSULTANT shall consist of services requested by the Project Manager or a designated representative including, but not limited to, the following:

0. Program Kick-Off

At the beginning of each annual cycle, CONSULTANT will meet with MTC Project Manager and other Program consultants to discuss Program guidelines and standardization of services, deliverable formats, and project administration.

1. Project Start-Up

1.1 Project Kick-Off Meeting – CONSULTANT will schedule a meeting with the project sponsor, other involved agencies, and MTC Project Manager or designated representative to kick-off the project; establish communication channels and protocols; discuss the scope of work, schedule, and budget; gather available information; and obtain a thorough understanding of the goals for the project.

1.2 Preparation of Detailed Workscope, Schedule, and Budget – CONSULTANT will prepare a detailed workscope, schedule, and budget (DWSB) for review and approval by the project sponsor, other involved agencies, and MTC Project Manager. CONSULTANT will finalize the DWSB based on comments received from the project sponsor, other involved agencies, and MTC Project Manager.

Deliverable 1:	Final Detailed Workscope, Schedule, and Budget

2. Analysis of Existing Conditions

CONSULTANT will collect and analyze all information necessary to thoroughly understand existing traffic conditions in the study area and be able to develop optimal time-of-day traffic signal coordination plans and transit signal priority plans, if applicable.

2.1 Data Collection – CONSULTANT will collect existing conditions data including, but not limited to, the following:

2.1.1. From the project sponsor and other involved agencies, CONSULTANT will collect existing timing sheets, existing coordination plans, traffic signal as-built drawings, aerial photos, maps, and three years worth of collision information, if available.

2.1.2. From the project sponsor and other involved agencies, including transit properties, if any, CONSULTANT will collect signal timing and signal priority preferences.

2.1.3. CONSULTANT will conduct weekday two-hour peak period turning movement counts at all study intersections, including pedestrian and bicycle counts, and seven-day 24-hour machine counts at strategic locations to determine periods of coordination. All counts shall be taken during times and days that are representative of the times and days for which coordination plans will be developed. All counts shall be summarized in digital format.

2.1.4. CONSULTANT will conduct a field review to verify lane geometry, speed limits, storage lengths, signal phasing, queue lengths at key intersections, and saturation flows for heavy movements at key intersections.

2.1.5. CONSULTANT will conduct a field review to observe typical traffic patterns during the weekday peak periods for which coordination plans will be developed. CONSULTANT will note factors that are expected to affect signal progression including, but not limited to: over-saturated intersections; uneven lane distribution; presence of trucks and buses; high-volume unsignalized intersections; parking maneuvers; presence of bus stops, etc.

2.1.6. CONSULTANT will conduct a field review to verify signal coordination and transit priority capabilities of existing equipment and communications infrastructure. As part of the field review, CONSULTANT will take digital photos of the controller cabinet and the contents of the controller cabinet.

2.1.7. CONSULTANT will conduct travel time and delay studies at key corridors during times and days that are representative of the times and days for which coordination plans will be developed. A minimum of four runs shall be conducted for each direction for each peak period. Travel time and delay studies shall be conducted using the floating car method

2.2 Analysis of Existing Conditions – CONSULTANT will analyze the data obtained from Task 2.1 as follows:

2.2.1. As permitted by the project stakeholders, CONSULTANT will review actuated settings and detector locations for each study intersection to identify opportunities to minimize delay during non-coordination periods and enhance pedestrian and bicyclist safety. The analysis shall include, but not be limited to, review of minimum and maximum green settings; yellow and red times; pedestrian timing; gap, extension, and reduction settings; and phase sequence. CONSULTANT shall also investigate the feasibility of implementing conditional service for protected left-turn movements and skipping phases.

2.2.2. CONSULTANT will review collision history within the study area to identify patterns that are susceptible to correction through signal timing.

2.2.3. Using software specified by the project sponsor, CONSULTANT will develop a model of the study area and calibrate the model based on field observations of existing conditions. Signal coordination optimization software may include, but not be limited to, Synchro, TRANSYT 7-F, or PASSER. Transit signal priority modeling software may include, but not be limited to, VISSIM or Paramics. CONSULTANT will calculate existing measures of effectiveness, including delay, number of stops, travel time, and emissions. Emissions shall be calculated using both the software's built-in emissions model and the latest emission reduction calculation methodology adopted by the Bay Area Air Quality Management District.

2.2.4. CONSULTANT will summarize the results of the existing conditions analyses in an Analysis of Existing Conditions Technical Memorandum. CONSULTANT will finalize the Memo based on comments received from the project sponsor, other involved agencies, and MTC Project Manager.

Deliverable 2:	Final Existing Conditions Technical Memorandum, including computer model with existing timings

3. Development of Draft Recommendations

CONSULTANT will develop recommendations of optimal actuated settings; time-of-day coordination plans and hours of coordinated operation; and transit signal priority plans and hours of operation, if applicable. Development of optimal time-of-day coordination plans shall include analyses of signal grouping, phasing, cycle lengths, splits, and offsets. CONSULTANT will summarize recommendations in a Recommendations Technical Memorandum. The Memo shall also include a comparison of existing and proposed timings and a

description of expected improvements. CONSULTANT will finalize the Memo based on comments received from the project sponsor, other involved agencies, and MTC Project Manager.

Deliverable 3:	Final Recommendations Technical Memorandum, including computer model with recommended timings

4. Implementation and Evaluation

CONSULTANT will implement and evaluate the approved improvements as follows:

4.1 CONSULTANT will prepare for review and approval by the project sponsor and other involved agencies appropriate timing sheets based on the approved timing plans. CONSULTANT will revise the timing sheets based on comments received from the project sponsor and other involved agencies.

4.2 CONSULTANT will implement, or assist agency staff in the implementation of, the new settings and timings. Implementation may have to be done in the field or from a central location, depending upon communication capabilities and agency preferences.

4.3 CONSULTANT will fine-tune, or assist agency staff in the fine-tuning of, the new settings and timings. CONSULTANT will fine-tune timings in the field and record all changes. Fine-tuning shall be conducted during times and days that are representative of the times and days for which coordination plans were developed.

4.4 CONSULTANT will conduct travel time and delay studies at the key corridors identified under Task 2.1.7. Travel time and delay studies shall be conducted during times and days that are representative of the times and days for which coordination plans were developed. A minimum of four runs shall be conducted for each direction for each peak period. Travel time and delay studies shall be conducted using the floating car method.

4.5 CONSULTANT will enter or upload data into the Traffic Signals Database. Data may include traffic counts, controller and cabinet information, and timing information.

4.6 CONSULTANT will calculate measures of effectiveness of the improved system, including delay, number of stops, travel time, and emissions. Emissions shall be calculated using both the software's built-in emissions model and the latest emission reduction calculation methodology adopted by the Bay Area Air Quality Management District.

4.7 CONSULTANT will summarize the final timing plans that were implemented and the results of the evaluation in a Final Timings and Evaluation Technical Memorandum.

Deliverable 4A:	Revised Timing Sheets
Deliverable 4B:	Final Timings and Evaluation Technical Memorandum, including Final Timing Sheets and computer model with final timings

5. Additional Services

For complex projects, such as those involving transit signal priority, cut-through traffic, multiple traffic signal systems, cross-coordination, etc., CONSULTANT may be requested to perform services in addition to those described above. Such services may include, but are not limited to, additional meetings, field visits, studies, fine-tuning, etc. Should additional services be requested, CONSULTANT shall include in the DWSB prepared under Task 1 a detailed description of such additional services, a staffing plan, and a man-hour estimate. The scope of these services, as well as the fixed price to be added to the base fee per intersection per scenario set

forth in Article 3B, will be negotiated on a case-by-case basis and included in the Final DWSB approved by MTC.

Timeline

Task #	Work Performed/Deliverables (#)	Target Completion Date for 2004 and 2005 Cycles
0	Program Kick-Off	mid-March
1	Project Start-Up	
	Kick-Off Meetings	mid-April
	Detailed Workscope, Schedule, and Budget (#1)	Late April
2	Analysis of Existing Conditions	
	Data Collection	Late May
	Analysis (#2)	Late July
3	Draft Recommendations (#3)	Late August
4	Implementation and Evaluation (#4A and #4B)	mid-November